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Diet and cardiovascular disease in the UK: are the messages getting across?

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Cardiovascular disease (CVD) is a leading cause of premature death in the UK and a major cause of ill health and disability. Whilst death rates from CVD have been falling since the late 1970s in the UK, levels of morbidity (such as angina) do not seem to be falling and may even be rising in some age-groups, especially as the population ages. There is broad consensus that lifestyle factors, including physical activity and diet, are fundamental determinants of heart disease risk. Current recommendations to reduce cardiovascular risk include maintaining a healthy body weight, eating five or more portions of fruit and vegetables each day, reducing intake of fat (particularly saturated fatty acids), reducing salt intake and eating one portion of oily fish per week. Although some improvements have been made in recent years (e.g. a reduction in total fat intake), national studies suggest that more effective campaigns are required to increase awareness of the benefits of these dietary changes. The present paper will discuss how the dietary messages relating to CVD are best communicated to the general public and will identify some of the main barriers to their implementation.

Cardiovascular disease: Diet: Emerging risk factors: Communication

The scale of the problem

Cardiovascular disease (CVD), including CHD and stroke, is the leading cause of premature death in the UK, accounting for 40 % of the deaths in men and 30 % of the deaths in women before the age of 75 years (British Heart Foundation, 2002). About half all CVD deaths are from CHD, which alone caused 125 000 deaths in the UK in 2000. While mortality rates from CHD have been falling since the late 1970s and death rates from stroke have been falling throughout the century, the decline has not been as impressive as that in other Western countries, such as the USA and Australia (Fig. 1), and the UK still has one of the highest CVD mortality rates in the world. Moreover, while survival rates may be improving as a result of better treatment and rehabilitation, levels of morbidity (such as angina) do not seem to be falling and may even be rising, especially as the population ages.

Conventional and emerging risk factors

The conventional risk factors for CVD include smoking, elevated cholesterol levels, raised blood pressure, low levels of physical activity and obesity. As these factors are strongly influenced by behavioural factors, there is now broad consensus that encouraging the population to adopt a healthy lifestyle (i.e. not smoking, being physically active and eating a healthy diet) is fundamental in reducing CVD risk (Department of Health, 2000*a,b*). For several decades the debate on diet and CVD has been dominated by the classic 'diet–heart' hypothesis, which predicts an adverse effect of dietary saturated fatty acids (SFA) and cholesterol and a beneficial effect of polyunsaturated fatty acid (PUFA) intake. Trials using diets low in SFA and supplemented with PUFA, principally *n*-3 fatty acids (found primarily in oil-rich fish), have been shown to reduce coronary mortality and improve survival (Hooper *et al*. 2001). Reductions in fat intake have, therefore, been the main focus of national dietary recommendations to reduce CVD risk (Department of Health, 1994; American Heart Association, 2000).

The inability of the established risk factors to account for all the variations in CVD between and within populations has, however, led to the emergence of a number of novel risk factors that are now being implicated as predictors of CVD. These factors include markers of maternal under-nutrition, inflammation, oxidative stress, infectious agents and increased levels of fibrinogen, homocysteine and lipoprotein(a). This situation has led to the realisation that the 'diet–heart' relationship is much more complex than previously recognised, and has highlighted several other

Abbreviations: CVD, cardiovascular disease; MUFA, monounsaturated fatty acids; PUFA, polyunsaturated fatty acids; SFA, saturated fatty acids.

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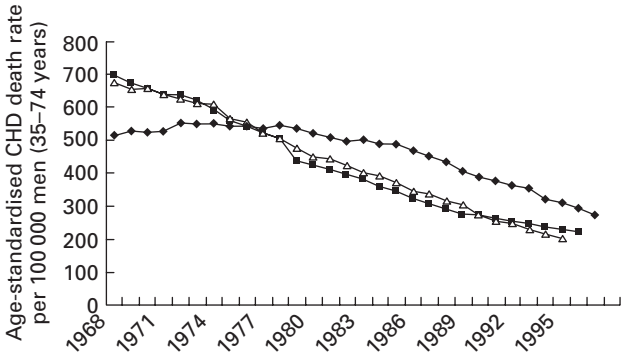

Fig. 1. Change in CHD death rates in selected countries (1968–96). (■–■), UK; (△–△), USA; (◆–◆), Australia. (Adapted from British Heart Foundation, 2002.)

aspects of the diet that may be important in CVD prevention. For example, an elevated plasma total homocysteine concentration is associated with increased risk of coronary disease and can be reduced by modest increases in the intake of folic acid (Department of Health, 2000*c*). Whether this approach reduces coronary risk remains to be established. Although this question is being addressed by ongoing randomised controlled trials, it has raised the possibility that there might be an important role for this vitamin in reducing vascular disease. The links between diet and these emerging CVD risk factors are currently the topic of a British Nutrition Foundation Task Force Report, to be published in 2004 (for further details, see www.nutrition.org.uk).

Dietary recommendations for primary prevention

Government recommendations to reduce CVD risk in the UK (Department of Health, 1994) include reducing total dietary intake of fat to < 35 % dietary energy intake and the intake of SFA to no more than one-third of fat intake. The recommendations also include an increase in the intake of long-chain *n*-3 PUFA to about 0·2 g/d, an increase in the percentage of dietary energy derived from carbohydrate to approximately 50 and a reduction in salt intake by at least one-third from its current level of 9 g/d to 6 g/d (Department of Health, 1994). Practical food-based advice for coronary prevention is, therefore, to maintain a healthy body weight, eat five or more portions of fruit and vegetables each day, reduce intake of fat (particularly SFA), reduce salt intake and eat at least two portions of fish, of which one should be oil-rich fish, each week (Table 1).

In the USA more recent recommendations have focused less on total fat intake (promoting a wider range of 25–35 % dietary energy compared with the previous recommendation of < 30 % dietary energy) and emphasised the importance of monounsaturated fatty acids (MUFA) in helping to keep levels of blood cholesterol (and other blood lipids) down (Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults, 2001). This recommendation relates to research demonstrating that MUFA reduce LDL-cholesterol but, unlike *n*-6 PUFA, they do not reduce protective HDL-cholesterol to the same extent. Moreover, low-fat high-carbohydrate diets have been shown to increase plasma triacylglycerol and decrease beneficial HDL-cholesterol levels (Mensink & Katan, 1992; Katan, 1997). Intervention studies using high-MUFA diets have also shown other potential benefits, including favourable influences on haemostasis (Sirtori *et al*. 1986; Lopez-Segura *et al*. 1996) and LDL oxidation (Reaven *et al*. 1991; Aviram & Eias, 1993), reduced inflammatory response (Yaqoob *et al*. 1998) and attenuated postprandial Factor VII responses to acute fat ingestion (Roche *et al*. 1998; Zampelas *et al*. 1998; Larsen *et al*. 1999; Kelly *et al*. 2001).

Table 1. Summary of practical dietary advice to reduce risk of CVD

To reduce consumption of all types of fat, e.g. by selecting lean cuts of meat and lower-fat dairy products, by reducing use of oil and full-fat spreads (margarine, butter), by eating fewer fried foods, and by moderating consumption of high-fat foods such as cakes, biscuits and savoury snacks
To opt for oils and spreads that are higher in monounsaturated fatty acids and lower in saturated fatty acids
To include more fruit and vegetables in the diet, aiming for at least five portions of a variety of fruits and vegetables each day
To include oil-rich fish in the diet once per week (those with heart disease may benefit from higher intakes)
To use less salt at the table and in cooking, and look for lower salt alternatives of manufactured foods
To include more starchy foods in the diet, e.g. bread, potatoes, yams, rice and pasta, so that ≥ 50 % energy intake comes from carbohydrate
To drink alcohol sensibly, i.e. ≤ 2–3 units per d for women and ≤ 3–4 units per d for men

Specific foods marketed for reducing cholesterol and cardiovascular disease risk

A number of specific foods or food components have been demonstrated to have blood cholesterol-lowering effects and may, therefore, be useful in reducing risk of CVD. For example, spreads that contain plant sterols or stanols have been shown to reduce LDL-cholesterol by approximately 10–15 % (Law, 2000). Stanol- and sterol-containing foods, which also now include yogurts, cereal bars and milk, may be helpful for those individuals with raised blood cholesterol levels, if the product is substituted for a standard product and eaten as part of a cholesterol-lowering diet and in conjunction with a healthy lifestyle. Another dietary component that may have a favourable effect on blood cholesterol is soluble fibre (e.g. from oats), which has been shown to lower plasma total cholesterol and LDL-cholesterol, although the effect is small for those consuming moderate amounts (Truswell, 2002). In addition, soyabean protein (≥ 25 g/d), included in a diet low in SFA, has been shown to reduce blood cholesterol concentrations by 0·23 mmol/l (89 mg/l; Anderson *et al*. 1995). Research has shown that individuals consuming a diet rich in wholegrain cereals (e.g. wholewheat cereals, wholemeal bread and brown rice) have markedly lower rates of CHD (Richardson, 2000; Truswell, 2002). Wholegrain cereals contain a number of components that may contribute to a reduced risk of heart disease, such as vitamin E and dietary fibre (Richardson, 2000). They also contain resistant starch and

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oligosaccharides that are fermented by intestinal bacteria to short-chain fatty acids that may help reduce blood cholesterol (Cummings *et al*. 1992), as well as plant sterols such as β-sitosterol that may also have cholesterol-lowering effects (Jones *et al*. 1997). Finally, several studies indicate that light-to-moderate alcohol consumption (1–2 units/d) may provide some protection against CHD, although any protection appears to be greatest post middle age. Much of this effect has been attributed to an increase in HDL-cholesterol, although alcohol may also influence several other CHD risk factors, including platelet function and fibrinolytic variables (Redmond *et al*. 2000).

Whilst including these specific items in the diet is likely to have beneficial effects on blood cholesterol, it is important to recognise that an elevated blood cholesterol level is only one risk factor for a multifactorial disease. It is, therefore, unlikely that a change in one food or nutrient in isolation will make any marked difference to CVD risk, unless implemented in conjunction with other lifestyle (e.g. smoking, physical activity, BMI) or dietary changes.

Are consumers responding to 'healthy eating' advice?

There is no doubt that consumers in the UK are becoming increasingly aware of, and interested in, the relationship between what they eat and their health. This concern is reflected in the large number of stories about diet, nutrition and health appearing in newspapers, magazines, on the radio and on television, and in the growth in sales of 'healthy options' marketed by manufacturers and retailers. There is also some evidence that consumers are adapting their diets in response to healthy eating advice. For example, household consumption of skimmed and semi-skimmed milk has risen dramatically and now holds the market share, while butter and whole milk have declined by at least 60 % since the mid-1970s (British Heart Foundation, 2002). Also, the consumption of poultry, leaner cuts of red meat and low-fat dairy products have been rising. Data from the National Food Survey (a government survey that provides information on national expenditure, consumption and nutrient intakes) has indicated some improvements in nutrient intake over the last 50 years (Department for the Environment, Food and Rural Affairs, 2001). For example, the daily intake of fat has fallen by >30 g since the mid-1970s, while the daily intake of SFA has dropped by >20 g over the same period. However, the simultaneous decline in total energy intake has meant that the change in fat and SFA as a percentage of food energy has been fairly small and still remains above the desired target values (current fat and SFA intakes are 38 and 15 % food energy respectively compared with the corresponding targets of 35 and 11 % food energy; Department for the Environment, Food and Rural Affairs, 2001; Fig. 2).

Changing dietary patterns over the last 50 years have substantially changed *n*-6:*n*-3 fatty acids in the diet. In particular, this change has occurred through the increased use of vegetable oils throughout the food industry and the decreased consumption of oil-rich fish, the major source of pre-formed long-chain *n*-3 fatty acids (British Nutrition Foundation, 1999). Data over the last decade have, however, indicated a slight readjustment and the popularity of oil-rich

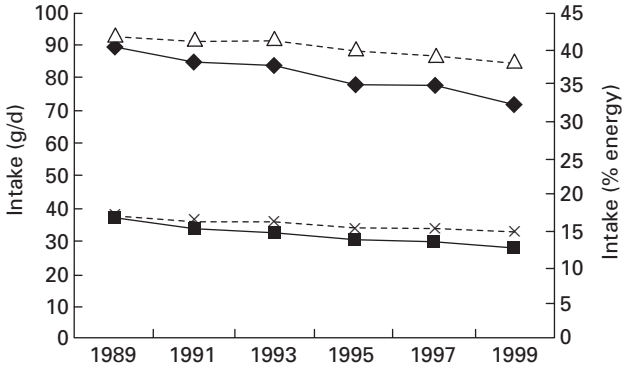

Fig. 2. Trends in fat (g/d, ◆—◆; % energy, △---△) and saturated fatty acids (g/d, ■—■; % energy, x---x) intake in the UK. (Based on data from Department for the Environment, Food and Rural Affairs, 2001.)

fish appears to have increased slightly in recent years. The Total Diet Survey (which is a model of the national average domestic diet in the UK and is based on food consumption data from the National Food Survey) showed that *n*-3 fatty acid intake rose from 1·6 g/d in 1991 to 1·8 g/d in 1995, while total intake of *n*-6 fatty acid fell from 10·7 g/d to 10·2 g/d over the same period (Ministry of Agriculture, Fisheries and Food, 1997).

Disappointingly, there has been little change in Na intake in recent years; average intake, excluding Na in table salt, has remained at around 2·6 g/d since 1985 (Department for the Environment, Food and Rural Affairs, 2001; although this data is unlikely to reflect any recent reductions in some manufactured foods). However, there does appear to have been a gradual increase in fruit and vegetable consumption, particularly fresh fruit and fruit juice, since the mid-1970s. There has also continued to be small increases in recent years (Department for the Environment, Food and Rural Affairs, 2001). However, total vegetable intake has not changed substantially and on average, adults are eating only about 260 g/d, approximately three portions daily (Department for the Environment, Food and Rural Affairs, 2001; Henderson *et al*. 2002), while children are eating only two portions daily (Gregory *et al*. 2000). These average amounts also mask large variations between individuals. For example, unskilled workers eat about 50 % less than professional groups, while children in the lowest income groups are about 50 % less likely to eat fruit and vegetables than those in the highest income groups. Intakes in Scotland are lower than elsewhere in the UK (Department for the Environment, Food and Rural Affairs, 2001).

Despite some slight dietary improvements in recent years, there is little evidence of any beneficial effect on the main diet-related CVD risk factors. Data from the Health Survey for England (Department of Health, 1999) shows that average cholesterol levels have changed little since reliable measurements have been made (between 1991 and 1998) and, while there has been a slight decrease in blood pressure independent of treatment, the proportion of those suffering from hypertension has remained fairly stable. However, any effects of recent dietary changes are likely to be offset by the continued rise in overweight and obesity,

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which increases CVD risk through its association with high blood pressure and hyperlipidaemia. Although data for trends in physical activity are not available, physical inactivity and sedentary lifestyle are likely to be key determinants of the growing rates of overweight and obesity in Western populations (Jebb & Moore, 1999). Initiatives that combat a sedentary lifestyle and provide opportunities to increase physical activity are, therefore, an essential adjunct to promoting a healthy diet, if improvements in the major diet-related CVD risk factors are to be achieved.

Persisting inequalities in cardiovascular disease

There are considerable variations in CVD mortality rates in different regions and within different social classes and ethnic groups throughout the UK. For example, South Asians living in the UK have 40 % higher CHD mortality rates than the UK national average (British Heart Foundation, 2002). In addition to higher rates in Scotland and Northern Ireland, the rates within England are also higher in the north than in the south. There is a consistent trend to increasing CVD mortality across the social classes, and several studies have reported higher mortality rates amongst manual workers compared with non-manual workers (British Heart Foundation, 2002). Evidence that these social and ethnic differences in CVD appear to be increasing suggests that current prevention strategies are being less successful amongst these groups. Whilst some of the social-class differences in CVD mortality rates can be attributed to a higher prevalence of smoking amongst men and women in lower socio-economic groups, there is also evidence of variation in diet-related risk factors. Whilst these social or regional variations cannot be explained by differences in the consumption of fat or SFA, or in blood cholesterol levels, there has been a social-class gradient for obesity and blood pressure, as well as for fruit and vegetable intake throughout the last decade, and there is also evidence of geographical differences in fruit and vegetable consumption, with the north of England and Scotland having lower intakes (Department for the Environment, Food and Rural Affairs, 2002).

Getting the message across

Consumers need health information that is clear and unambiguous. They are also likely to respond more favourably when nutrition messages do not conflict with individual taste preferences. Negative messages, encouraging consumers to 'cut down', 'eat less' or 'avoid' certain foods, are destined to meet with powerful resistance. Encouraging consumers to reduce consumption of fat, especially SFA is, therefore, a complicated task. Some of the main messages relating to CVD risk do, however, benefit from being positive and encouraging a higher consumption, e.g. eating more fruit and vegetables or eating more oil-rich fish. Whilst there is always the temptation to complicate the advice, short unequivocal messages targeted on single behaviours have been shown to be most effective (Williams, 1995).

Probably the most consistent dietary advice over the years has been to increase fruit and vegetable consumption, although the scientific rationale underpinning this advice has shifted with emerging evidence about the health benefits of the various components. Concerns that simply recommending 'more' did not give consumers any information about how much is reasonable, and that it might encourage complacency about present levels of consumption, led national agencies in the UK, and elsewhere, to quantify the recommendation as a target of at least five portions of fruit and vegetables daily. This target is based on the amount of fruit and vegetables needed for a balanced diet and is considered to be consistent with the epidemiological evidence on desirable intakes (World Health Organization, 1990; Department of Health, 1994). The 'five-a-day' message has many attractive qualities in terms of health promotion; it is simple, clear, positive, quantified and food-based. Interventions using this approach in different settings have demonstrated an increase in awareness of the health benefits of fruit and vegetables (Beresford *et al*. 2001; Stables *et al*. 2002) and recommendations of 'at least five a day' have become a central part of many nutrition education programmes and are supported by a number of ongoing government initiatives. For example, in England the Department of Health has been identifying successful interventions to increase fruit and vegetable intake, including the School Fruit Scheme and the Five-a-Day Campaign (details at www.doh.gov.uk) and this work is now being evaluated. Public awareness of this message does appear to be growing in the UK, particularly amongst women (Food Standards Agency, 2001), and it is now widely used in the popular media (Williams, 1995), although some confusion remains amongst consumers as to what foods are included and what constitutes a 'portion'. For this reason, the Department of Health is in the process of clarifying the message, and intends to launch a campaign to improve its understanding in Autumn 2003.

Presenting a consistent message: the role of the media

The relationship between diet and health now enjoys widespread media coverage, and the media can, and do, disseminate useful information to the public. However, the general public often admits to being confused by a plethora of contradictory messages and headlines, which are often incorrect or at least misleading and can result in apathy or increased anxiety. The common perception that scientific opinions are conflicting and constantly changing has led some consumers to become sceptical about nutrition messages (Patterson *et al*. 2001). As a consequence, health professionals often accuse journalists of disseminating disagreement and spreading uncertainty. Quite clearly, the media can play a powerful role in influencing health behaviour, and the need to both entertain and inform must be recognised. However, it is essential that the eventual message is accurate and unambiguous, and that controversial research is reported within the context of existing knowledge (The Social Issues Research Centre and the Royal Institution, 2000). The peer review process adopted by leading scientific and health journals helps to ensure the quality of published research; media reporting of early findings before publication is, therefore, problematic and

should be undertaken with caution. Scientists also need to ensure that press releases informing journalists of new research provide details about study limitations and do not exaggerate the importance of their findings (Woloshin & Schwartz, 2002).

Determinants of dietary change

Primary prevention of disease by dietary means is notoriously difficult, not least because individuals are not motivated by associations between diet and health, and in many cases they do not perceive a need for change. This attitude can be related to the concept of optimistic bias, which refers to a phenomenon in which individuals underestimate the risk to themselves relative to others from a variety of hazards. This feeling of being at less personal risk is found for many dietary risks, and motivational approaches used in health psychology can be helpful.

Unfortunately, the delivery of consistent dietary messages to consumers does not automatically result in positive and long-term dietary change. This situation can be attributed to the reality that there are a number of factors that influence food choice besides knowledge of the link between diet and health, as well as a number of barriers beyond which consumers have no control. In effect, many of these factors cannot be modified, e.g. age, gender and educational factors, socio-economic and cultural factors. However, there are additional factors that can further hinder individuals from putting acquired knowledge about diet and lifestyle into practice. Clearly, cost and access to food (e.g. the price of leaner cuts of meat, travel costs to supermarkets on the outskirts of town centres) will affect the practical ability to change, whereas food preferences, acceptability, life skills (e.g. cooking), health and attitudes to health, knowledge and understanding of the 'healthy eating' messages and the ability to translate these messages into practical food-based advice, as well as the readiness to change, will affect the extent of change. Many of these influences are more easily modified than others, e.g. cooking skills compared with food preferences. Positive dietary change has also been hindered because some groups are less amenable to change than others (e.g. teenagers compared with pregnant mums). It is also likely that the most vulnerable or the most in need of change are the most difficult to reach.

Recognition and a greater appreciation of the factors that influence food choice and evaluation of past interventions should result in more effective strategies, improved communication and successful implementation. Although it may appear obvious, dietary messages that complement lifestyles are more likely to be successful than those that require considerable changes to habit. This effect was recently illustrated in an evaluation of an array of interventions to increase fruit and vegetable intake in the USA; average fruit intake, but not vegetable intake, increased (Potter *et al*. 2000). This outcome is likely to be a result of the ease with which fruit (*v*. vegetables) can be consumed, e.g. as snack foods. Increased awareness of the benefits of fruit and vegetables in the UK warns against a change in the initiatives in place, although evaluation of current initiatives should indicate whether separate approaches are necessary.

Barriers to change: the role of the food industry

The slow progress in reaching dietary targets can also be attributed to a shift away from cooking meals from basic ingredients and reliance on ready-made and convenience foods. This position is illustrated by the difficulties encountered by individuals in reducing their salt intake. Salt is used as a preservative and flavour enhancer, and is commonly found in processed food such as bread and cereal products, breakfast cereals, meat products, pickles, canned vegetables, tinned and packet soups and sauces and savoury snack foods. Salt is also often added to butter, spreads and cheese during manufacture. Approximately 10–15 % of the Na is naturally present in food, 60–75 % is derived from processed foods, with the remaining 15–20 % added to food at the table and/or during cooking. Hence, it is particularly difficult for consumers to meet guidelines such as the need to increase intake of carbohydrates to 50 % energy intake and decrease intake of salt simultaneously. It is encouraging that discussion between the food industry and Government is underway to identify ways in which the salt content of processed foods can be further reduced. Substantial reductions have been made in some sectors (e.g. bread) over the past 20 years, and a number of major retailers have taken action to reduce the salt content of their own-brand products.

Changes in the food supply will also be necessary in order to meet the population target for average fatty acid intakes. This need was demonstrated by a recent study in a university hall of residence setting, in which the amount of potentially-exchangeable (added) fat was found to be less than one-third of the total daily fat intake (Nydahl *et al*. 2003). Consumers have no control over fat that is intrinsic in food (e.g. cheese and meat) and, as a consequence, food manufacturers play an important role in influencing nutrient intakes. For example, the positive step taken by industry to make available leaner cuts of meat and reduced-fat dairy products has certainly contributed in a major way to the decline in fat intake observed in the UK. The population as a whole has also benefited from the response of the food industry to concerns about the levels of *trans*-fatty acids in hydrogenated vegetable and fish oils (Mensink & Katan, 1990). Today, emulsifier technology rather than industrial hydrogenation is used to produce the solid physical characteristics of 'high-PUFA' margarines that are now widely available. Consequently, average intake of *trans*-fatty acids does not appear a cause for concern (Hulshof *et al*. 1999).

Despite the advocated benefits of oil-rich fish, consumers are reluctant to increase consumption, perhaps as a result of a genuine dislike of this food or lack of knowledge about how to cook or prepare it. Certainly, sales of supplements of fish oil indicate that the benefits are recognised, although these supplements are an expensive source of these fatty acids. The food industry has provided some alternative strategies, e.g. the manipulation of the diets of farm animals resulting in eggs rich in *n*-3 fatty acids and *n*-3 PUFA enrichment of meat producing fatty acid profiles similar to those of grass-fed animals. The fats and spreads market can use highly-refined fish oils that have been deodorised and enriched with antioxidants. Furthermore, a dietary intervention study has shown that manufactured foods enriched with eicosapentaenoic acid and docosahexaenoic acid, via

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microencapsulation, are a feasible vehicle for increasing the intake of these long-chain PUFA (Lovegrove *et al*. 1997), without compromising palatability. The difficulty with these innovations is that there are cost implications for consumers, not least because they may be marketed as functional foods.

Consumer resistance to low-fat products and low adherence, in the long-term, to fat-reduced commodities may hamper further progress towards dietary targets (especially in certain sectors of society) (Williams *et al*. 1999). In fact, Williams *et al*. (1999) have suggested that high-MUFA diets may offer a practical means of achieving the target for SFA intake and of reducing cholesterol levels, and may be more acceptable to consumers than advice to reduce fat intakes to levels of < 35 % dietary energy. High-MUFA diets may also be more appropriate for those for whom fat and energy restriction may be unnecessary. This example again highlights the contribution that the food industry can make to the health of the nation, by producing foods that have a more beneficial fatty acid profile. These extensive changes in fatty acids require modifications to the diet as a whole and cannot be implemented by the use of supplement capsules. In intervention studies high-MUFA diets have been shown to be acceptable and are practical to implement. However, a comprehensive range of foods that are habitually consumed, and adapted to be rich in MUFA, would need to be made available in food outlets for the population at large to benefit.

With increased reliance on processed foods, the need for clear and effective labelling is emphasised. At present, many consumers find it difficult to interpret nutrition labelling and apply this information to the dietary guidelines. This area is one that has been targeted recently by the Food Standards Agency, and consumer research is underway that will help to identify the best content and format for nutrition labelling.

The food industry has responded to advances in nutrition research, which have resulted in beneficial changes to the population's diet. Research and development of new products will continue, e.g. conjugated linoleic acid (CLA)-enriched products have attracted some interest. CLA is naturally present in milk, dairy products and the meat of ruminant animals (beef and lamb) and has been attributed numerous health benefits in animal models, although the effects of CLA in human trials are to date disappointing (Calder, 2002). Existing and new products are not, and should not, be considered as a quick fix solution and do not detract from the importance of a balanced diet.

Summary

There is a strong relationship between diet and risk factors for CVD. Current knowledge has been translated into practical dietary guidelines that need to be communicated to the general public. The media can, and do, play an important role in getting these messages across, but failure to do so accurately and consistently can result in public confusion and cause apathy or unnecessary anxiety. Whilst there have been some successes in changing the population's diet, these have mostly occurred where consumers have been able to make similar choices at no extra cost (e.g. switching to lower-fat milks and reduced-fat spreads). An increasing demand for pre-prepared and processed foods has increased consumer dependence on food manufacturers to provide healthier products (e.g. lower-fat products, reduced-salt alternatives) if substantial changes to their nutrient intake are to be made. This situation emphasises the need for effective and accurate nutritional labelling and claims. In order to tackle the socio-economic, ethnic and geographical inequalities in CVD, issues such as availability and price must be considered, in particular in relation to fruit and vegetables. Educating children in nutrition and food skills, including cooking, is also essential if the population's ability to prepare and cook foods is to be preserved.

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